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<p>(21) International Application Number: PCT/SE99/00901</p> <p>(22) International Filing Date: 27 May 1999 (27.05.99)</p> <p>(30) Priority Data: 9801876-5 27 May 1998 (27.05.98) SE</p> <p>(71) Applicant (for all designated States except US): VOLVO PERSONVAGNAR AB [SE/SE]; S-405 08 Göteborg (SE).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): GHOSE, Barin [SE/SE]; Linnarhultsvägen 24, S-424 55 Angered (SE). ANDERSSON, Björn [SE/SE]; Prilyckegatan 51, S-425 32 Hisingers Backa (SE). HERMANSSON, Stig [SE/SE]; Lärkgatan 17, S-442 31 Kungälv (SE). ADOLFSSON, Jonas [SE/SE]; Norra Dalervägen 2, S-429 30 Kullevik (SE).</p> <p>(74) Agents: ANDERSSON, Per et al.; Albihns Patentbyrå Göteborg AB, P.O. Box 142, S-401 22 Göteborg (SE).</p>		<p>(81) Designated States: JP, US, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p>
<p>(54) Title: ANTI-THEFT ARRANGEMENT IN A VEHICLE DOOR</p> <p>(57) Abstract</p> <p>A vehicle door (12) provided with an anti-theft arrangement (10). The vehicle door has an outer door skin (14) and an inner door skin (16) defining a door cavity (18) therebetween in which a door lock assembly is mounted. The outer door skin (14) and the inner door skin (16) are spaced from each other along an upper edge of the door to thereby define a window glass opening (22) to the door cavity (18) through which a window glass (24) can be raised and lowered. The door cavity (18) further houses an anti-theft arrangement (10) having a cover (26) shielding the door lock assembly. The cover has a major extension substantially in a principal plane, the cover further having an upper edge region (30), an adjacent side edge region (32) and at least one further edge region (34) to thereby form a peripheral boundary of the cover (26). The upper edge region (30) presents a flange section (36) and the cover (26) is mounted in said door cavity (18) such that the flange section (36) lies adjacent the window glass opening (22) and extends substantially parallel to the opening.</p> <div data-bbox="941 1113 1380 1701"> </div>		

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TITLE: Anti-theft arrangement in a vehicle door

TECHNICAL FIELD:

The present invention relates to an anti-theft arrangement for mounting in a vehicle door according to the preamble of claim 1 and to a vehicle door provided with an anti-theft arrangement according to the preamble of claim 11.

BACKGROUND OF THE INVENTION:

It is a general goal within the automobile industry to improve security against unauthorized entry into a locked vehicle. In a vehicle door, the door lock assembly is accommodated in a cavity created between an outer door panel and an inner door panel. This cavity also houses a window winding mechanism for raising and lowering a window glass. Thus, in its lowered position, the window glass is also accommodated substantially within the door cavity.

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A common method of gaining unauthorized entry into a vehicle is by insertion of a tool between the outer door panel and the window glass to access the door lock assembly. Several proposals have been made to render such access more difficult. For example, it is known from GB-A-2 299 309 to provide a U-shaped element which at least covers the lock rod leading from the exterior door handle to the door lock assembly, thereby rendering manipulation of the lock rod more difficult. US-A-5 435 609 proposes the provision of an anti-theft tube which surrounds the sill knob rod of the lock assembly so as to make access to the rod more difficult. US-A-4 603 894 discloses mounting the door lock assembly, the inside door handle, the power lock actuator, the various bell crank levers and associated connecting rods upon a module frame off the assembly line, purportedly to enable construction of a preassembled and tested door lock and handle module for subsequent mounting on the vehicle door. A moulded plastic cover fits over the assembled module to enclose the door lock rod in an attempt to prevent unauthorized entry into the vehicle by the insertion of a tool

between the door outer panel and the window glass to actuate the door lock rod.

Whilst the above-described previous attempts to prevent unauthorized entry probably do render access more difficult, the fact remains that a thief can still gain access to the door cavity via the gap between the outer door panel and the window glass.

SUMMARY OF THE INVENTION:

It is therefore an object of the present invention to provide an anti-theft arrangement in a vehicle door which further renders more difficult access to the door lock assembly in the door cavity.

This object is achieved by the anti-theft arrangement as claimed in claim 1.

The invention further relates to a vehicle door provided with the anti-theft arrangement of the present invention, as claimed in claim 11.

Preferred embodiments of the anti-theft arrangement of the present invention are detailed in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS:

The invention will be described in the following in greater detail by way of example only and with reference to preferred embodiments shown in the attached drawings, in which:

Fig. 1 is a schematic perspective view of the anti-theft arrangement of the present invention mounted in a vehicle door;

Fig. 2 is a schematic cross-sectional view taken along line A-A of Fig. 1;

Fig. 3 is a schematic perspective view of a cover included in the anti-theft arrangement of the present invention, and

Fig. 4

is a schematic perspective view of a window glass guide for use with the cover of Fig. 3.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS:

5 In Figs. 1 and 2, reference numeral 10 generally denotes an anti-theft arrangement for mounting in a vehicle door 12. The vehicle door comprises an outer door skin 14 and an inner door skin 16 defining a door cavity 18 therebetween. The cavity is intended to receive a door lock assembly, of which an operating rod 20 is shown in Fig. 2. The outer door skin 14 and the inner door skin 16 are spaced from each other along an upper edge of the door to thereby define a window glass opening 22 to the door cavity through which a window glass 24 can be raised and lowered by a not- shown conventional winding mechanism.

15 The door cavity 18 further houses the anti-theft arrangement 10 of the present invention. The anti-theft arrangement comprises a cover 26 shielding the door lock assembly. The cover has a major extension 28 substantially in a principal plane, with the sectional view in Fig. 2 being taken through this plane. In most cases, the principal plane of the cover will be substantially parallel to the inner door skin 16. The cover 26 has an upper edge region 30, an adjacent side edge region 32 and at least one further edge region 34 to thereby form a peripheral boundary of the cover.

20 In accordance with the present invention, the upper edge region 30 of the cover 26 comprises a flange section 36, with the cover being mounted in the door cavity 18 such that the flange section 36 lies adjacent the window glass opening 22 and extends substantially parallel to the opening. For the purposes of the present invention, the expression "adjacent the window glass opening" means that a portion of the flange

section 36 lies within 5 cm, preferably within 3 cm, of the opening as seen from within the cavity 18.

More specifically, the flange section 36 of the upper edge region 30 of the cover 26 is
5 angled with respect to the principal plane of the cover to form an included angle of less than 90 degrees. In other words, and as is most clearly shown in Fig. 2, the flange section 36 forms a pocket 38 to partially surround the door lock assembly. Advantageously, the flange section 36 presents an included angle of between 20 and 70 degrees, preferably between 30 and 60 degrees and most preferably about 45
10 degrees. In this manner, the flange section 36 is generally parallel to the extension of the outer door skin 14 in the region adjacent the window glass opening 22 (see Fig. 2).

Due to the proximity of the flange section of the cover 26 to the window glass
15 opening 22, very little space is available within the door cavity 18 in the region of the door lock assembly for a thief to manipulate a tool. To further increase safety, in a preferred embodiment of the invention, the flange section 36 of the cover 26 has a material stiffness which is greater than other portions of the cover. In this manner, it becomes harder for a thief to puncture the cover to gain access to the door lock
20 assembly.

The additional material stiffness may be imparted by the flange section 36 further comprising at least one reinforcing element 40. The reinforcing element 40 may be located either on the side of the cover facing the door lock assembly or the side of the
25 cover facing away from the door lock assembly or on both sides. The reinforcing element may be of the same material as the remainder of the cover or may be of a different, for example harder, material. Preferably though, the reinforcing element 40 is a strip of the same material as the remainder of the cover, for example polypropylene, to thereby facilitate fabrication of the anti-theft device. If the cover is
30 made of polypropylene, it may have an average material thickness of between 1.0 and 3.0 mm, preferably about 2.0 mm. Thus, the flange section 36 presents a material

thickness which is at least 50% greater, preferably at least 100% greater, than the average material thickness of the remainder of the cover 26. Of course, the reinforcing element may be provided with ribs or other stiffness-increasing means.

5 To facilitate mounting of the cover 26 in the door cavity 18, the adjacent side edge region 32 of the cover 26 presents a clamping flange 42 extending substantially perpendicular to the principal plane in a direction away from the flange section 36, i.e. away from the door lock assembly. The clamping flange 42 is adapted to receive a window glass guide 44 in the form of a generally u-shaped channel. The window glass
10 guide is most clearly shown in Fig. 4. The window glass guide 44 is affixed to the inner door panel 16, for example using screws, to thereby clamp the clamping flange 42 between the inner door panel 16 and the window glass guide 44. The cover 26 may also be provided with one or more openings through which screws can pass to screw the cover to the door lock assembly.

15 The window glass guide 44 may be made from steel or aluminium and can be lined with rubber or some other material which is suitable for supporting the window glass so that it does not rattle in the guide 44.

20 In accordance with a preferred embodiment of the invention, the window glass guide 44 is provided with a deflection surface 46 extending substantially parallel to the clamping flange. The deflection surface 46 may be formed integrally with the window glass guide, or may be a bracket-like attachment mounted to the wall of the u-shaped channel disposed furthest from the cover 26. The deflection surface 46 extends from a
25 point substantially adjacent the flange section 36 on the cover, i.e. from a point adjacent the window glass opening 22. The deflection surface 46 serves to prevent a thief gaining access to the door assembly by trying to manipulate a tool past the clamping flange 42 on the cover 26. Depending on the actual layout of the door lock assembly and other components within the door cavity 18, the deflection surface 46
30 can advantageously extend along the window glass guide 44 for between 5 and 15 cm.

As is most clearly apparent from Fig. 3, the cover 26 of the anti-theft arrangement 10 may be provided with one or more rubber-type flaps 48 along at least a portion of the further edge region 34. The rubber-type flaps may be made from any suitable flexible, elastic material. The rubber-type flap or flaps 48 are intended to rest against the outer door panel 14 when the anti-theft arrangement is installed in the vehicle door. To this end, the cover 26 presents sections 50 which are angled from the principal plane of the cover towards the outer door skin. The rubber-type flaps are affixed to the cover on the angled sections 50 and serve to take up manufacturing tolerances and to prevent the cover 26 from rattling within the door cavity 18. In addition, the flaps ensure that no gap is left between the cover 26 and the outer door skin 14 through which a thief may try to insert a tool. The flaps 48 may be treated with a low-friction coating to facilitate mounting of the cover 26 within the door cavity 18.

As has been previously mentioned, the cover 26 is preferably made from plastic such as polypropylene. Thus, the rubber-type flap or flaps 48 can be united with the cover 26 in a double injection moulding process in which the cover itself is initially moulded and the rubber-type flaps are then placed in the mould to be bonded to the cover. Alternatively, the flaps 48 can be adhered, rivetted or screwed to the cover.

To allow an interior door handle to cooperate with the door lock assembly behind the cover 26, the cover is provided with an opening 52 (Fig. 3) through which an operating rod can pass.

Although the invention has been described above with reference to certain embodiments, it is to be understood that the invention is not restricted to these embodiments, but may be varied within the scope of the appended claims. For example, the window glass guide 44, rather than being a separate component, may be
5 moulded in one piece with the cover 26.

CLAIMS:

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1. An anti-theft arrangement (10) for mounting in a vehicle door (12), said arrangement comprising a cover (26) having a major extension substantially in a principal plane, said cover having an upper edge region (30), an adjacent side edge region (32) and at least one further edge region (34) to thereby form a peripheral
10 boundary of the cover, characterized in that said upper edge region (30) comprises a flange section (36) angled with respect to said principal plane to form an included angle of less than 90 degrees.

2. The anti-theft arrangement (10) as claimed in claim 1, characterized in that said
15 flange section (36) presents an included angle of between 20 and 70 degrees, preferably between 30 and 60 degrees and most preferably about 45 degrees.

3. The anti-theft arrangement (10) as claimed in claim 1 or 2, characterized in that
20 said flange section (36) has a material stiffness which is greater than other portions of said cover (26).

4. The anti-theft arrangement (10) as claimed in claim 3, characterized in that said
material stiffness in said flange section (36) is attained by said flange section further comprising at least one reinforcing element (40).

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5. The anti-theft arrangement (10) as claimed in claim 4, characterized in that said
flange section (36) presents a material thickness which is at least 50% greater,
preferably at least 100% greater, than the average material thickness of the remainder
of the cover (26).

30

6. The anti-theft arrangement (10) as claimed in any one of the preceding claims,

characterized in that said adjacent side edge region (32) of the cover presents a clamping flange (42) extending substantially perpendicular to said principal plane in a direction away from said flange section (36).

5 7. The anti-theft arrangement (10) as claimed in claim 6, characterized in that said clamping flange (42) is adapted to receive a window glass guide (44) in the form of a generally u-shaped channel.

8. The anti-theft arrangement (10) as claimed in claim 7, characterized in that said
10 window glass guide (44) is provided with a deflection surface (46) extending substantially parallel to said clamping flange (42), said deflection surface (46) extending from a point substantially adjacent said flange section (36) on said cover.

9. The anti-theft arrangement (10) as claimed in any one of the preceding claims,
15 characterized in that said at least one further edge region (34) of said cover (26) is provided with a rubber-type flap (48).

10. The anti-theft arrangement (10) as claimed in claim 9, characterized in that said
20 cover (26) is made from plastic, preferably polypropylene, and in that said rubber-type flap (48) is united with said cover in a double injection moulding process.

11. A vehicle door (12) provided with an anti-theft arrangement (10), said vehicle door comprising an outer door skin (14) and an inner door skin (16) defining a door cavity (18) therebetween in which a door lock assembly is mounted, said outer door
25 skin (14) and said inner door skin (16) being spaced from each other along an upper edge of said door to thereby define a window glass opening (22) to the door cavity (18) through which a window glass (24) can be raised and lowered, said door cavity (18) further housing said anti-theft arrangement (10), said anti-theft arrangement comprising a cover (26) shielding said door lock assembly, said cover having a major
30 extension substantially in a principal plane, said cover having an upper edge region (30), an adjacent side edge region (32) and at least one further edge region (34) to

thereby form a peripheral boundary of the cover (26), characterized in that said upper edge region (30) comprises a flange section (36) and in that said cover (26) is mounted in said door cavity (18) such that said flange section (36) lies adjacent said window glass opening (22) and extends substantially parallel to said opening.

5

12. The door (12) as claimed in claim 11, characterized in that said flange section (36) is angled with respect to said principal plane such that said flange section is generally parallel to the extension of the outer door skin (14) in the region adjacent said window glass opening (22).

10

13. The door (12) as claimed in claim 11 or 12, characterized in that said flange section (36) has a material stiffness which is greater than other portions of said cover (26).

15

14. The door (12) as claimed in claim 13, characterized in that said material stiffness in said flange section (36) is attained by said flange section further comprising at least one reinforcing element (40), said reinforcing element being located either on the side of the cover facing the door lock assembly or the side of the cover facing away from the door lock assembly or on both sides.

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15. The door (12) as claimed in claim 14, characterized in that said flange section (36) presents a material thickness which is at least 50% greater, preferably at least 100% greater, than the average material thickness of the remainder of the cover (26).

25

16. The door (12) as claimed in any one of claims 11 to 15, characterized in that said adjacent side edge region (32) of the cover (26) presents a clamping flange (42) extending substantially perpendicular to said principal plane in a direction away from said flange section (36).

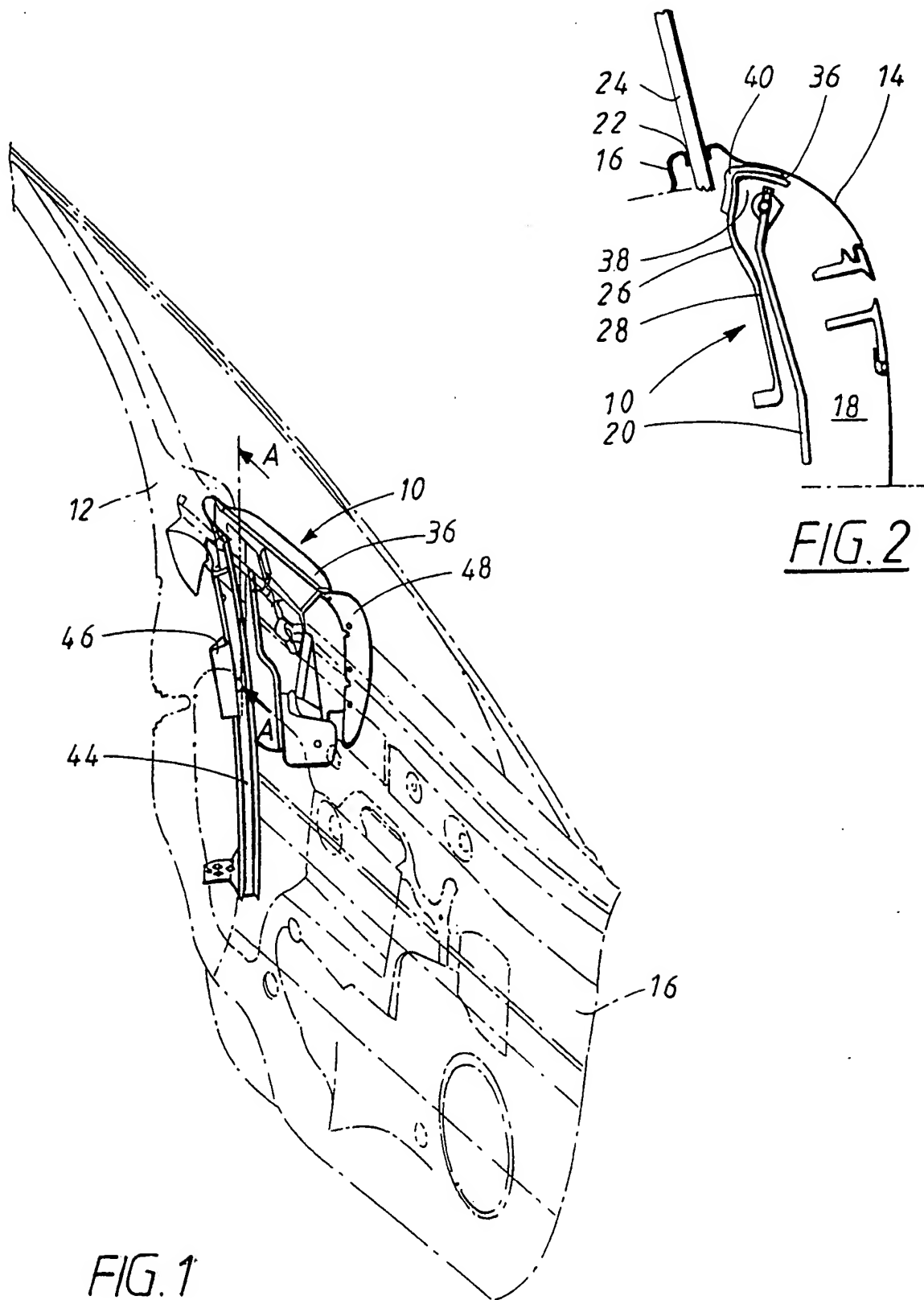
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17. The door (12) as claimed in claim 16, characterized in that said clamping flange (42) is adapted to receive a window glass guide (44) in the form of a generally u-

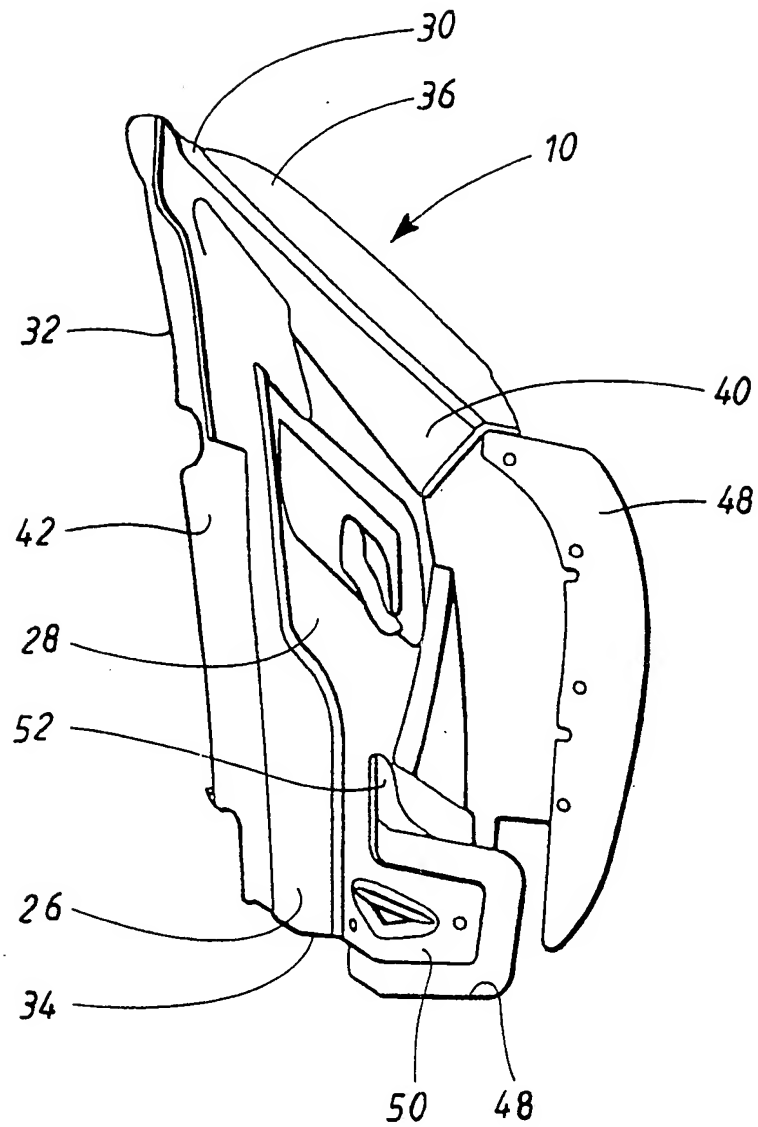
shaped channel, said window glass guide (44) being affixed to the inner door panel (16) to thereby clamp said clamping flange (42) between the inner door panel and the window glass guide.

5 18. The door (12) as claimed in claim 17, characterized in that said window glass guide (44) is provided with a deflection surface (46) extending substantially parallel to said clamping flange (42), said deflection surface extending from a point substantially adjacent said flange section (36) on said cover (26).

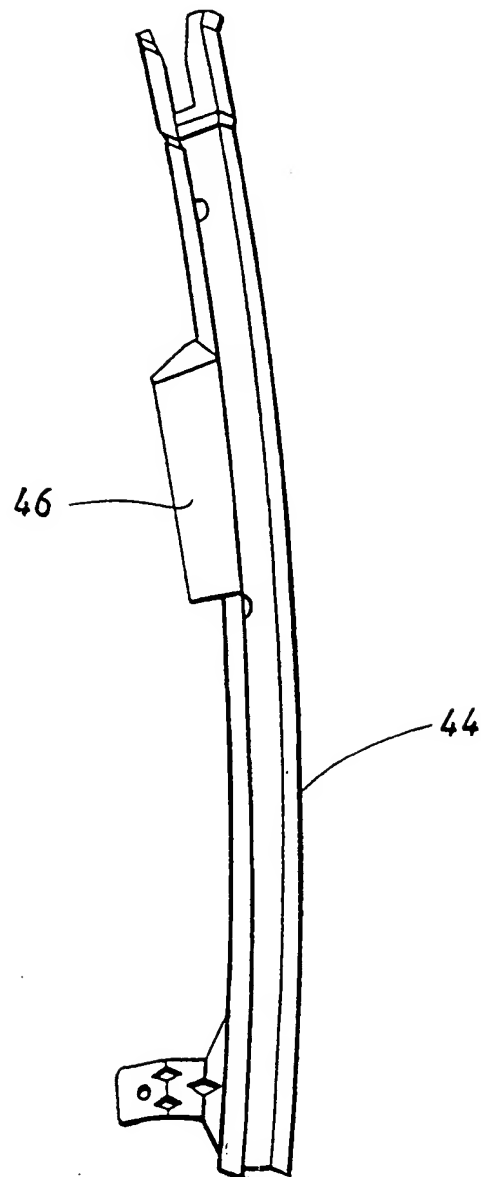
10 19. The door (12) as claimed in any one of claims 11 to 18, characterized in that said at least one further edge region (34) of said cover is provided with a rubber-type flap (48), said rubber-type flap resting against said outer door panel (14).



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FIG. 3

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FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/00901

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E05B 65/20, E05B 27/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5676002 A (H.W. HOEPTNER, III), 14 October 1997 (14.10.97)	1
Y	--	2,6,10,12
X	US 4628300 A (L. AMATO), 9 December 1986 (09.12.86)	11
Y	JP 9-323543 A (KANO MAKOTO), 16 December 1997 (16.12.97)	2,12
Y	EP 0162535 A2 (GENERAL MOTORS CORPORATION), 27 November 1985 (27.11.85)	10

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

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27-09-1999

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INTERNATIONAL SEARCH REPORT

International application No.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 3530861 A1 (SCHRAMM, P.-J.), 12 March 1987 (12.03.87) ----- --	6,16